REMARKS

Claims 21-33 are in the application.

In the action, the Examiner rejected all of the pending claims (claims 21-33) as indefinite under 35 U.S.C. § 112, second paragraph because of uncertainty as to the meaning of the phrase "the representation is specified separately from at least one processor." The Examiner also rejected the claims under 35 U.S.C. § 112, first paragraph, for failure to enable "how the representation(s) is/are being acted upon by the processor(s)." Finally, all of the claims were rejected as anticipated or obvious over Marshall, US 5,675,746 ("**Marshall**"), which discloses a "virtual reality generator" for displaying financial data in a "virtual reality world."

Applicant has amended the claims for the reasons given below. In addition, Applicant has made one correction of a grammatical nature to the specification (to make clauses in a sentence agree in number).

In addressing these rejections, the Applicant will begin with the indefiniteness and enablement rejections, because the answers to the questions raised by those issues also explains the novelty of the present invention over prior art systems such as those described by Marshall.

Meaning and Enablement of the Phrase: "said representation is specified separately from said at least one processor"

The present invention provides for processors that can be specified independently from the specification of the types of instruments, as well as the specific instances of those instrument types (herein referred to as "deals") that they process. In accordance with the invention, not only can one processor process a plurality financial instruments (a one-to-many relationship), but that there is ***independence*** of specification such that there is a ***many-to-many*** relationship among processors and instruments. The base claim, claim 21, has been amended by changing the word "separately" to "independently" so as to make the foregoing clear. Applicant believes that with this understanding in mind (which we will further explain below, with reference to the specification), the manner of operation of the invention should be clear, as should the fact that the invention is not anticipated by Marshall.

The ability to have processors specified independently from the financial instruments that they process, that is, to manifest the "many-to-many" capability referred to above, derives from the fact that the present invention involves not only a direct representation of the contractual terms of a financial instrument, but in addition an ***intermediate representation*** of the resulting deal, i.e., what the specification refers to as the "event representation" – which is comprised of standardized components (analogized at p. 8, l. 8 of the specification to "Lego blocks") reflecting events under the deal as they occur over time. It is this intermediate representation, and not the original representation, that is acted upon by the processor, and that fact is key to why the processor can be specified independently from the specification of the representation of the deal.

According to the present invention, every instrument specification is first written in a "static" form (the "instrument specification" as referred to, e.g., at p. 10 of the specification), a form indicative of the general contractual terms of the instrument and from which the type of instrument involved may be readily recognized. For example, see the left-most column of both Figs. 5 and 7. The static representation is abstract – it represents a type of instrument, but not a particular instance of an instrument (i.e., a specific "deal"). Prior to processing the instrument, the static representation is combined (by another processor – see claim 23) with an agreed deal's specific contractual provisions or "instrument parameters" (e.g. agreed start date, agreed end date, agreed amount) into an "event representation" – a time-domain representation comprised of "financial event streams" (see center column of Fig. 7), much the same as a source program is transformed (by compiler tools) into object code that may be directly executed. The entire set of generated event streams, taken together, describes an instance of a deal based on the instrument that had been statically represented. This event representation of the deal is in terms of the payments and other financial events that occur in connection with the deal over time, rather than in terms of the instrument's general contractual provisions.

It is important to note that, in accordance with the invention, each event stream contained within the event representation is comprised of events that are standardized in nature, i.e., consistently defined and utilized from instrument to instrument. These event types need only be registered with the processor objects and the processor objects can then generically process any instruments that utilize those event types (see specification at p.

41, ll. 21-24). The available financial events for this purpose are chosen so that, in various combinations, they are capable of representing a wide range of instruments of commercial interest.

At run time, a processor that is processing deals in accordance with the invention traverses the entire event representation of the deal, and processes each event as it is encountered during the traversal. See right-most column in Fig. 7 and specification, p. 40, ll. 10-13). However, because each event processor is entirely generic, the processor need not know in advance the totality of the event structure, or, for that matter, anything about the static representation of the instrument. See specification at p. 43, ll. 20-26. (The processing whereby the static representation is transformed into the event representation, although performed at an earlier stage, is performed in a comparable manner. See specification at p. 22, l. 23 – p. 37, l. 24, where this stage of processing is discussed at length.)

The implication of the foregoing is the ability to have a "many-to-many" relationship between processors and instruments as referred to in the opening paragraph above – the fact that that one processor may be used to process completely different types of instruments, and that multiple, alternative processors may be used to process a given deal, without supplementing or redefining the instrument's specification. For example, a given processor in accordance with the present invention could process a common stock as easily as it could process an interest rate swap (a typical financial derivative), without being informed prior to commencing processing, which type of instrument was being processed. These are two entirely different types of instruments, yet they could be processed by the same processor. Alternately, the users of the invention could decide they wanted to perform processing in an alternate manner, and could specify a new processor employing a completely different processing methodology, which would be capable of processing a plurality of instrument types, and this could be done without modifying any of the instrument specifications. The present invention makes this possible. The ability to do this represented a significant advance over the prior art at the time this application was originally filed, and is of considerable value today.

The foregoing is what the specification and claims mean when they speaks in terms of processing being specified "independently" from the instrument specification.

As for enablement, the specification spells out in detail the implementation of the steps that accomplish what is described in the preceding paragraphs. The three components involved in this aspect of the invention are (i) the financial instrument static representation, (ii) the "event" specification of an agreed contract of the instrument (the deal), and (iii) processing. These components are enabled, respectively, at the following locations in the specification: p. 15 l. 4 – p. 18 l. 3. (static representation); p. 19, l. 7 – p. 21, l. 22 ("Sample Instrument Specifications"), p. 18, l. 20 – p. 19 l. 6 (event representation), p. 22, l. 23 – p. 37 l. 25 (event extraction), and p. 39 l. 24 – p. 52 l. 23 ("Generic Processing Framework"). Pictorially, these elements are all reflected in Fig. 7 (showing all three of static representation, event representation and processing). More detailed views of the static and event representations are shown in Figs 4 and 5 and a more detailed view of an event stream in shown in figs. 8 and 9. Figs 10-13 illustrate "processing" in detail. Applicant respectfully submits that the above-referenced specification text and drawings provide complete enablement for each aspect of claim 21.

Distinguishing the Prior Art

It can be immediately observed based on the foregoing that Marshall cannot possibly anticipate the present invention as reflected in claim 21. Fundamentally, Marshall represents a class of financial processing that typified the prior art – in which a processing component simply takes as its inputs quoted market data and produces some output. As reflected in claim 21, the present invention involves the step of first generating an event representation of the financial instrument, and then processing that representation, which makes possible a much more highly generalized processing model. Marshall does not teach such a sequence of operations, and since it is that sequence of operations that makes possible the type of processing implemented by the present invention, those references fail to provide the significant advantages afforded by the present invention. In fact, it can be seen that the processors described in Marshall (and comparable references) are all tied, in their specification, to the types of data that they are intended to act upon, making them incapable of functioning in accordance with the present invention.

Marshall involves the use of a virtual reality ("VR") system for visualizing financial instruments, as displayed within the virtual world created by Marshall's system.

The "processing" described in Marshall involves the following:

(1) ***Analytic processing*** - Processing input data on the front end by off-the-shelf systems of types identified (e.g., the CAPRI Financial Analysis System), or by custom analytic systems. Col. 4, l. 48 – col. 5, l. 22. However, except insofar as Marshall identifies sources of then commercially available analytic systems, and refers to possible custom systems by general type (rule-based expert system, neural network, etc.), there is no disclosure of how the analysis is performed, either by the commercially available or by the custom systems. Indeed, the mechanism whereby this analysis is performed is not material to the invention in Marshall, because this analytic data is merely a form of input for Marshall's system. (The latter point (the analytic system being merely an "input") is made explicit at col. 4., line 48 of Marshall.)

(2) ***Display processing*** – Displaying selected data and analytic results (from one of the aforementioned front-end systems) using VR "metaphors" (shapes, three-dimensional objects, etc., representing financial instruments) which are rendered and animated within a VR three-dimensional coordinate system.

(3) ***Enhanced display processing*** – Providing display enhancements based on further manipulation of inputs (e.g., (A) a virtual "missile" that can home in on the most profitable stocks (for example) encountered as the user "flies" through the virtual world, or (B) adjusting the Z axis displacement of a metaphor based on a comparison of its current price against a moving average. This type of processing involves performing arithmetic comparisons of or applying statistical functions to the input data. See Fig. 10 of Marshall.

In each case the "processing" involved in Marshall either constitutes input itself (case (1)), or involves operations directly upon inputs that comprise quoted market data or analytic functions of quoted market data (cases 2 or 3). However, without any teaching that the inputs to be processed can be generically processed – and there is no suggestion

that this is the case – there is no basis for expecting it even to be ***possible*** for any processor employed in Marshall to be specified independently from the specification of the inputs.

Indeed, it is apparent throughout Marshall that the inputs and the processing capability are specified ***in coordination with each other in advance*** – i.e., during design time of the system. There are statements throughout Marshall to this effect. For example, consider the following:

> "The input module would therefore communicate with the application program ***using a protocol recognized by the application program.***" Col. 5, ll. 65-67 (emphasis added).

> "For example, the user has the option of defining a characteristics seeking missile to be launched from the plane. The user may define the missile as a profit seeking missile (***using a preselected definition of profit***). When activated, profit seeking missiles will zoom in on, for example, the stocks that are the most likely to be profitable." Col. 7, ll. 13-20 (emphasis added).

> "Using the user instructions 10, the virtual reality generator causes an input module 8 to obtain from an analytic system (not shown), ***using queries 12 understandable by the analytic system***, pre-processed financial information 14 that complies with the user instructions 10. This financial information is supplied to the virtual reality generator 4." Co.. 8, ll. 8-12 (emphasis added).

> "The special action indicator 36 is, in the representative embodiment, a characteristics seeking missile. The user defines a financial characteristic, for example profit, bankruptcy, or volume. ***Using known analytical formulas***, the virtual reality generator 4 of the present invention will seek out the area or areas in the virtual reality world that best satisfy the characteristic defined by the user." Col. 10., ll. 1-7 (emphasis added).

"In the representative embodiment, ***the user's selections are translated by the user interface module into a form that the CAPRI analytic system can understand***. The CAPRI analytic system will then output to the input module 8 of the present invention only that information that satisfies the defined queries." Col. 10, l. 65 – col. 11, l. 3 (emphasis added).

"In a representative embodiment, the input is received in three files or packets, namely FUND.PRI, DAILY.PRI and SPIN.PRI. The input can be received in response to a query 12 from the input module 8 or at regular predetermined intervals. ***All input files, in the examples, are in the Reuter's symbol format.***" Col. 14, ll. 40-45 (emphasis added).

Indeed a study of how all the components of Marshall work and interoperate make it clear that the limitations reflected above, wherein processors request inputs in forms that the input system "can understand," are inherent in the underlying architecture of Marshall. These operational limitations are directly contrary to the design principles of the present invention, in which "processor independence" is paramount. See, e.g., specification at p. 8, ll. 23-25. The mechanisms of the present invention cannot work when these design principles are violated.

In sum, it is apparent that every embodiment disclosed in Marshall presupposes that inputs are specified in a manner understandable by the desired processors, and conversely, that processors are specified based on the specifications of the available inputs, i.e., a conventional one-to-many relationship. There is no teaching in Marshall whereby Marshall would be capable of functioning in the manner recited in claim 21, i.e., with processors that could be specified independently of the specification of the instruments that were being processed. Applicant submits that Marshall in no way anticipates or even suggests the elements of the present invention as recited in claim 21.

Applicant addresses claims 23, 25-28 and 30-33 insofar as to note that as dependent claims they are each narrower than the base claim from which they depend (claim 21) and should be deemed patentable if their ultimate parent is patentable. MPEP 608.01(n).

Reasons for Amendment

Applicant is amending claim 21 for purposes of clarification. Applicant submits that the additional language added to claim 21 by the present amendment merely clarifies what the terms "representation" and "processing" meant as such terms were used in the specification, and thus the express incorporation of these words does not change the meaning or scope of the claim.

The word "separately" was changed to "independently" also for purposes of clarification. The term "separately" as used in the specification was with reference to "processor independence," and was used in a manner that necessarily implied "independence," such that there could be a many-to-many relationship between processors and data (as opposed to merely a one-to-many relationship of the sort that characterized prior art processing). The only interpretation that the present amendment would relinquish (and Applicant's position is that this is not an interpretation that was ever intended), is one in which "separately" might be read to cover implementations in which a one-to-many but not a many-to-many relationship existed between processor(s) and instrument(s). Because when read in light of the specification claim 21 as initially presented should not have been construed to read on a one-to-many relationship between processors and instruments, the present substitution of the word "independently" for "separately" does not reflect a narrowing amendment to claim 21.

The claims depending from claim 21 were reorganized without changing the substance of the series of dependent claims. Claim 24 concerned processing of event streams, which was inherent in claim 21 as previously presented, and has now been explicitly recited in claim 21 by reason of the present amendment Hence, Applicant has requested that the cancellation herewith of claim 24 be without prejudice.

Claims 1-20 were previously canceled for the reasons stated in connection with the Request for Continued Examination filed on October 10, 2003.

Information Disclosure Statement

Applicant filed a further information disclosure statement ("IDS") with its Request for Continued Examination. However, the Office Action did not indicate that the Examiner had reviewed or signed off on the references cited. Applicant respectfully

requests that that the Examiner act on the IDS, and consider and make of record the references cited therein. If necessary, Applicant can provide replacement copies.

CONCLUSION

The Applicant believes that the foregoing should fully resolve all current grounds of rejection, and earnestly solicits allowance of the application.

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